

NOTES AND COMMENTS

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SHORT NOTE ON FOSSIL PIPUNCULIDAE (DIPTERA) FROM DOMINICAN AMBER

Pipunculidae are small, usually darkish and inconspicuous flies, closely related to hoverflies (Syrphidae). They can be differentiated by the large compound eyes occupying most of the hemispherical head and by the wing venation. During their larval stage, they are parasitoids of Auchenorrhyncha (Homoptera). World-wide, more than a thousand species are known, distributed over 22 genera (De Meyer, 1994). The fossil record for Pipunculidae is however very limited. Aczél (1948) gave a review of all described specimens. They are all from Baltic amber except one from Miocene Florissant shale. Since then no new descriptions or records were published on fossil pipunculids. Through the kind courtesy of Dr. David Grimaldi (American Museum of Natural History, New York), the author had the opportunity to study new material of Pipunculidae found in Dominican amber. It concerns here two female specimens in two separate inclusions and in fairly good condition. Below follows a description with general discussion on their phylogenetic position.

DESCRIPTION

Eudorylas sp. A
(Fig. 1)

Material. 1 female, in amber from Dominican Republic, specific provenance unknown, purchased from Manuel Perez, AMNH coll Nr DR 11-21. Estimated Oligo-Miocene.

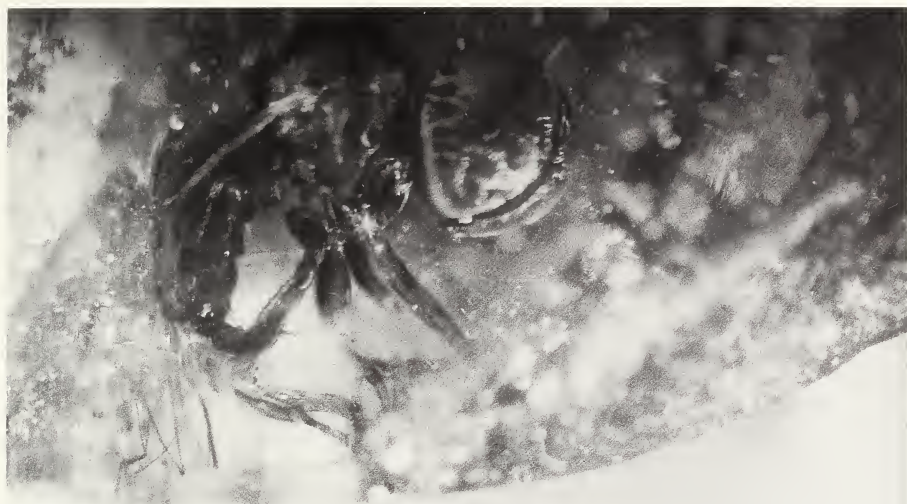
General Habitus (Fig. 1a): The specimen is completely embedded in amber and almost complete (part of left wing and of left mid leg missing). Right hand side is clearly visible; the left and dorsal views are obscured by series of small bubbles and other inclusions. The right wing is folded but most structures and venation visible. Thorax is completely transparent. Most ommatidia, especially anterior ones are obscured. Antennal segments are transparent and hardly discernible.

Description. Body length: approx. 3.5 mm; wing length: approx. 4.2 mm.

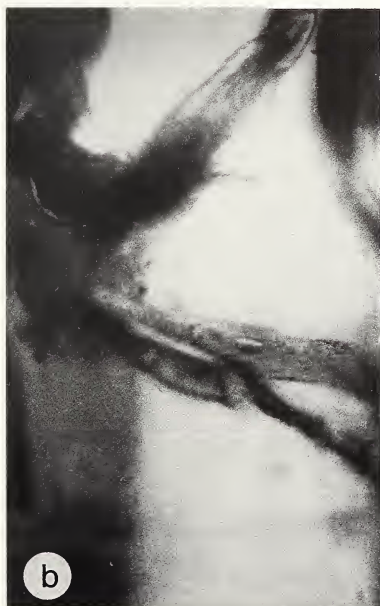
Female. Head. Anterior eye facets apparently considerably enlarged (not clear because of obstruction by inclusions). Third antennal segment acuminate; second antennal segment with few short bristly hairs below and above. Front only moderately widened in the middle. Occiput hardly broadened in upper part (Fig. 1c).

Thorax. Propleural fan absent. Mesonotum with dorsocentral hairs apparently completely reduced. Scutellum with row of short fine hairs along apical margin.

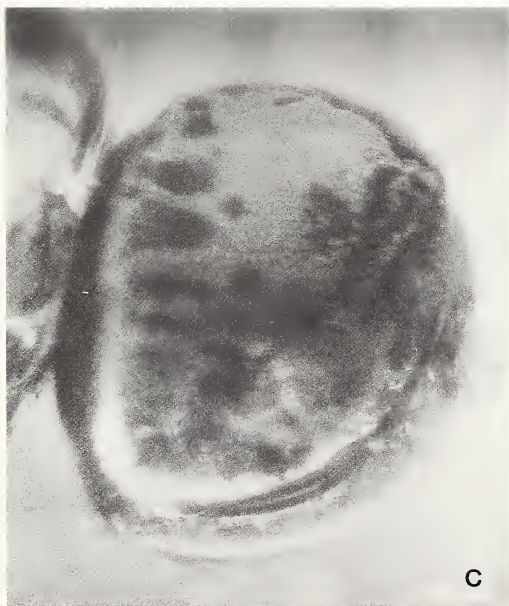
Legs simple and typical shape for genus (Fig. 1a). Femora, only mid femur with approx. 7 developed ventral spines at apical third. Front femur apically with few dispersed spiny bristles, poorly developed. Hind femur apparently without ventral



a



b



c

Fig. 1. *Eudorylas* sp. A. a: general habitus, lateral view. b: ovipositor and hind legs, lateral view. c: head, lateral view.

spines. Differences in coloration indicates femora with darkened median ring occupying about half of entire length, more extensively so in front four femora. Tibiae with erected median bristle; front four tibiae with apical spines. Tarsal segments with last tarsal segment darker; pulvilli slightly larger than last tarsal segment, claws more distinctly so.

Wings. Third costal section with pterostigma coloured, coloration not clear but distinct difference in transparency (looked at from certain angle) occupying full length of section. Fourth costal about as long as third section. Cross-vein r-m at base of third section, approx. at basal third of discal cell. Vein M1+2 simple.

Abdomen. Lateral fan with row of long darkish bristly hairs. Terga apparently without pilosity, except few short bristles on tergum 6. Terminalia well developed with base longish and oblong, not bilobed and with median protuberance below; piercer about as long as base, curved upwards (Fig. 1b). In dorsal view apparently with lateral protuberances (not clear, partly obscured).

Discussion. The specimen shows characteristics of Eudorylini: propleural fan absent, and pterostigma coloured. The ovipositor resembles some *Tomosvaryella* species but wing venation (coloured pterostigma, shape and length of third and fourth costal sections) and shape of occiput (not especially broadened in upper part) do not correspond with this representatives of this genus. Within the Eudorylini, the specimen shows characteristics found in the genera *Eudorylas* and *Metadorylas*: second antennal segment with only few short bristles; third antennal segment acuminate, not obtuse. The shape of the ovipositor does not correspond however with the characteristic shape found in contemporary *Metadorylas* sp. but is similar to structure found in some *Eudorylas* like the Nearctic *E. vierecki*. I therefore propose to put the species in the genus *Eudorylas*. Rafael (in press) recently described a number of new *Metadorylas* and *Eudorylas* species from the Dominican Republic. However most of them are based on male material only and no association could be made with the fossil material.

Eudorylas ? sp. B
(Fig. 2)

Material. 1 female, in amber from Dominican Republic. AMNH coll Nr DR 10-1453. Estimated Oligo-Miocene.

General Habitus (Fig. 2a): The specimen is completely embedded in amber and seemingly complete. Only clearly visible from ventral view; dorsal view completely obscured by large air inclusion, most of lateral views also obscured. One wing almost completely spread out and clearly visible, other wing folded. Among other inclusions two Auchenorrhyncha.

Description. Body length: approx. 2.2 mm; wing length: 2.6 mm.

Female. Head. Anterior eye facets greatly enlarged (Fig. 2a). Third antennal segment acuminate; second antennal segment with few short bristly hairs below and above. Front and upper part of occiput not visible.

Thorax. Propleural fan absent. Mesonotum at lateral side with few dispersed moderately long hairs, dorsocentral hairs not visible, possibly completely reduced.

Legs simple and typical shape for genus (Fig. 2a). Femora, mid femur distinctly with developed ventral spines at apical part. Front and hind femora apparently with-

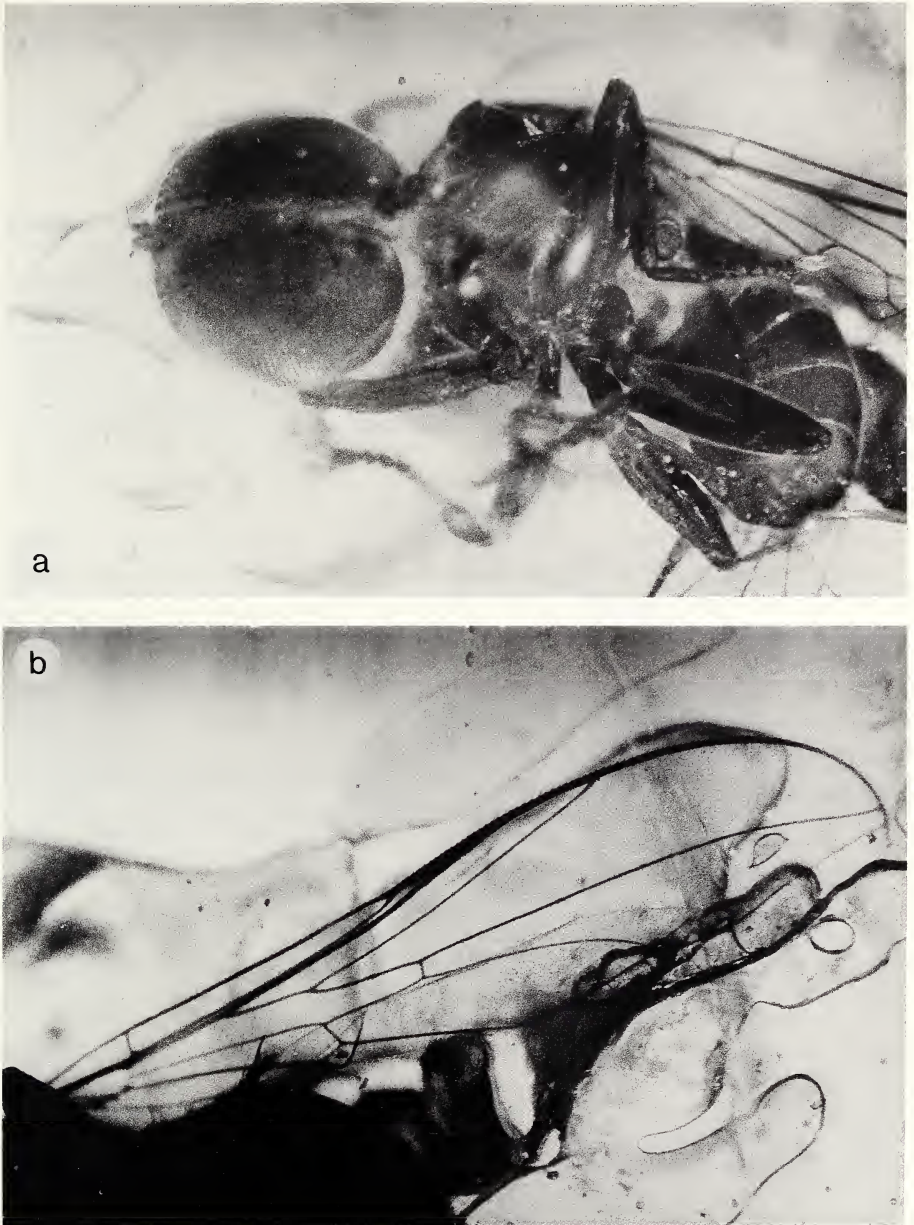


Fig. 2. *Eudorylas* sp. B. a: general habitus, ventrolateral lateral view. b: left wing, ventral view.

out well developed ventral spines. Femora seemingly darkened except narrowly apically. Tibiae without erected median bristle or apical spine. Pulvilli and claws larger than last tarsal segment.

Wings (Fig. 2b). Third costal section with pterostigma distinctly coloured over entire length of costal section. Fourth costal slightly shorter than third section. Cross-vein r-m at base of third section, approx. at basal third of discal cell. Vein M1+2 simple.

Abdomen. Lateral fan with well developed row of long darkish bristly hairs. Terga apparently without pilosity. Terminalia well developed with base longish and oblong, not bilobed; piercer about 1.5 times as long as base, slightly curved upwards.

Discussion. This female specimen also seems to have most of the characteristics of the genus *Eudorylas*. The propleural fan is absent and the pterostigma is distinctly coloured. Because of the restricted view, its position is not very clear. It seems to be related to the previous species based on the general morphology and the shape of the ovipositor, except for the small differences outlined above and the difference in size.

GENERAL DISCUSSION

As mentioned above, the pipunculid fossil record is very limited. In total, Aczél (1948) lists 12 known specimens. *Protonephrocerus florissantius* is the only specimen from Florissant Shales of Colorado (USA). All other fossils are preserved as inclusions in Baltic amber.

The most important fact of the recent findings in Dominican amber is the phylogenetic position of the specimens concerned. Recently Rafael and De Meyer (1992) proposed a generic classification of the Pipunculidae based on a cladistic analysis. In this they differentiated three subfamilies, with the Pipunculinae divided into five tribes (Fig. 3). All earlier fossil records monographed by Aczél (1948), belong to the more plesiomorphic groups Chalarinae and Nephrocerinae (Fig 3). The author could re-examine the florissant shale specimen during a recent visit to the Museum of Comparative Zoology, Cambridge (Massachusetts, USA). The impression is weak but is undoubtedly a pipunculid. Deducing from the size, general shape and shape of the head can it indeed most likely be placed in the subfamily Nephrocerinae. The other specimens could not be studied but Aczél's redescription and analysis is adequate to confirm subfamily or tribal position. Most known specimens belong to the genus *Verrallia* or a related plesiomorphic sister genus. Others belong to Nephrocerinae (genus *Nephrocerus* and *Metanephrocerus*). The only specimen of uncertain tribal position is *Cephalosphaera baltica*. As indicated in Rafael and De Meyer (1992), the specimen could well belong to *Parapipunculus* but air inclusions obscuring the dorsal view make a definite placement not possible. This would either put it in the Pipunculini or the Cephalopsini. Both specimens from Dominican amber clearly belong to a more apomorphic group, the Eudorylini.

Some hypotheses can be proposed with this respect to the evolution of the group. All Baltic amber specimens are estimated to be of Eocene or lower Oligocene origin (40–50 mill Yrs). Dominican amber is considered younger, from Oligo-Miocene origin (20–25 mill Yrs) (Grimaldi et al., 1994). This would explain why the older fossils predominantly represent older lineages and that more evolved groups like

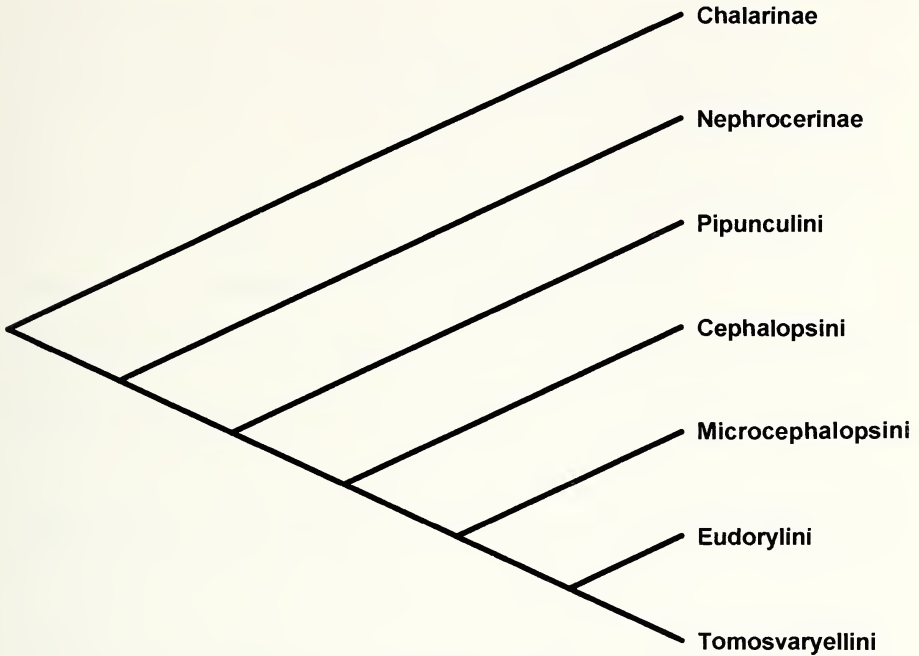


Fig. 3. Phylogenetic relationships within Pipunculidae.

Eudorylini could have been still absent in that period. The fossil record is however too limited to make definite conclusions.—*Marc De Meyer, Dept. Invertebrate Zoology, National Museums of Kenya, P.O. Box 40658, Nairobi, Kenya.*

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NOTES ON GASTERUPTIID WASPS (HYMENOPTERA: EVANIOIDEA)

The family Gasteruptiidae is a little-known group of parasitic wasps, easily characterized by the highly-placed articulation of the elongated metasoma on the propodeum. The family is divided into two subfamilies, the Hyptiogastrinae with five genera of Gondwanan distribution, and the Gasteruptiinae with one cosmopolitan genus (*Gasteruption* Latreille). Little is known about the biology of gasteruptiids, but all species for which host records exist are parasites of Apoidea s.l. (Townes, 1950; Malyshev, 1968; Mason, 1993). *Gasteruption assectator*, *G. jaculator*, and *G. pedemontanum* have been observed to rob from the cells of the megachilid bee *Megachile rotundata* (Megachilidae) in Russia (Narolsky and Shcherbal, 1991), and some Australian and New Zealand species are known to victimize bees of the families Colletidae and Stenotritidae (Jennings and Austin, 1994a, b). Adults of some species are thought to feed on pollen (Jennings and Austin, 1994b: 1292). Those species North of Mexico with recorded hosts all have been taken from nests of bees in the families Colletidae, Megachilidae, and Apidae (*sensu* Roig-Alsina and Michener, 1993). Outside of these few host records, the biology of nearctic species is completely unknown (Mason, 1993). Herein I present a new host record for *G. assectator arca* found in the cell of a megachilid bee in Central New York. *G. assectator* has previously been recorded in nests of *Hylaeus ellipticus* (Colletidae) and *Megachile rotundata* (Megachilidae) in North America (Krombein et al., 1979).

SUBFAMILY GASTERUPTIINAE, GENUS *GASTERUPTION* LATREILLE

***Gasteruption assectator arca* (Couper)**

NEW HOST RECORD: Taken from *Hoplitis producta* (Cresson) cell (Hymenoptera: Megachilidae; Megachilinae). Nest dug into the pith of a twig. Cell Nr. 5, Cornell University Lot Nr. 1040, sub. site B, nest 111, Tompkins Co., NY, 28 April 1974, Suellen Vernoff. Cornell University Insect Collection.

SUBFAMILY HYPTIOGASTRINAE, GENUS *PSEUDOFOENUS* KIEFFER

***Pseudofoenus pedunculatus* (Schletterer)**

LOCALITY: 1 male, New Zealand, North Island, South Auckland, Tahunanui, 14 January 1928, E. S. Gourlay. Cornell University Insect Collection.